

# ISO TC184/SC4/WG10 N160

and also TC184/SC4 N\_\_

Date: 31 January 1998

Supersedes SC4/WG11 Nnnn (T\_\_)

## PRODUCT DATA REPRESENTATION AND EXCHANGE

Part: na Title: AP Modularization Issue Log

Purpose of this document as it relates to the target document is:

☐ Primary Content Current Status: na  
☒ Issue Discussion  
☐ Alternate Proposal  
☐ Partial Content

**ABSTRACT:** The issues against the AP modularization approach.

### KEYWORDS:

#### Document Status/Dates

##### Part Documents

##### Other SC4 Documents

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## Introduction

This initial issues log is the product of the two ISO TC184/SC4 WG10 AP Modularization workshops held in London January 6-8, 1997 and in Gaithersburg January 13-15, 1998. These issues have been categorized into the following categories developed at the Gaithersburg workshops:

- 1 - Guidelines and Methodology
- 2 - Technical Development
- 3 - Framework/Catalogue
- 4 - Process/Organization

These issues were generated against several inputs:

- 1 - *An Approach to AP Modularization* white paper submitted at the Florence WG10 meeting October 1997.
- 2 - *An Approach to AP Modularization* presentation first presented at the Florence WG10 meeting in October.

Note : The subsection of this presentation addressing specific guidelines and characteristics was presented at both the London and Gaithersburg workshops.

- 3 - A draft *Proposal for Application Module Development Guidelines Revision 0.4* developed prior to and presented at both the London and Gaithersburg workshops.
- 4 - Several sample Application Modules and a presentation of the process used prepared by PDES, Inc.

Other inputs to the workshops also resulting in the generation of issues and actions from the workshops. These included:

- 5 - *Industrial Information Model* white paper from Chris Vaughan representing Rolls-Royce which was presented at the London workshop.
- 6 - *Modular Development of STEP Application Protocols* presentation by Julian Fowler in London and repeated for Julian by David Price in Gaithersburg.
- 7 - *AP Development Guidelines for Shipbuilding* WG3 N701 paper discussed by Tim Turner at the London workshop.

The intent is for the resolution of these issues to further the completion of the development of the STEP AP Modularization process.

The issues generated at the London meeting are marked with an “L” and those from the Gaithersburg workshop are marked with a “G”.

## Issues List

## ***Guidelines and Methodology***

ISSUE NUMBER: 1 (L1)

STATUS: OPEN

DESCRIPTION:

How did the shipbuilding building block approach work and should it's guidelines be merged into the proposed approach?

RESOLUTION:

ISSUE NUMBER: 2 (L7)

STATUS: OPEN

DESCRIPTION:

Industry terms in AP - is this sufficient? Do we need an AP ARM to AM ARM mapping? If we do, what would the AP ARM do differently from the AM ARM?

RESOLUTION:

ISSUE NUMBER: 3 (L12)

STATUS: OPEN

DESCRIPTION:

Would it make sense to have conformance classes in APs that are sets of constraints on populations, not subsets of entities?

RESOLUTION:

ISSUE NUMBER: 4 (L15)

STATUS: OPEN

DESCRIPTION:

Should allowing redefinition of attributes in AM be allowed since it would be reused anyway? Ray Goult and others stated this is less of a problem in AMs than it would be in an AP.

RESOLUTION:

ISSUE NUMBER: 5 (L18)

STATUS: OPEN

DESCRIPTION:

Make a distinction between AM ARM completeness (i.e. AM ARM need not be implementable) and completeness/level of detail for AIM/MIM EXPRESS. Using EXPRESS to represent the ARM is not intended to require a more detailed ARM than in today's AP.

RESOLUTION:

ISSUE NUMBER: 6 (L24)

STATUS: OPEN

DESCRIPTION:

Be USING an ARM from another AM you DO get the mapping included in your AM. You do NOT redocument the mapping. State this explicitly in the guidelines.

RESOLUTION:

ISSUE NUMBER: 7 (L28)

STATUS: OPEN

DESCRIPTION:

Will AM development address the issue of conformance class conflicts (and CCs being too big)? CC often don't meet industry needs.

RESOLUTION:

ISSUE NUMBER: 8 (L29)

STATUS: OPEN

DESCRIPTION:

For AM validation need both ARM to MIM and MIM to ARM population mapping.

RESOLUTION:

ISSUE NUMBER: 9 (L31)

STATUS: OPEN

DESCRIPTION:

In writing AM scope, beware of using generally used STEP terms or those in an IR. Only use them if the meaning is exactly what is defined elsewhere. Review of product identification module prompted this discussion.

RESOLUTION:

ISSUE NUMBER: 10 (L34)

STATUS: OPEN

DESCRIPTION:

We need to reach consensus on what AMs are for before we can agree on guidelines for scoping AMs.

RESOLUTION:

ISSUE NUMBER: 11 (L35)

STATUS: OPEN

DESCRIPTION:

We need to reach consensus on what AMs are for before we can agree on guidelines for scoping AMs.

RESOLUTION:

ISSUE NUMBER: 12 (L38)

STATUS: OPEN

DESCRIPTION:

Current APs (and thus AMs) loses the real requirements. These need to be preserved.

RESOLUTION:

ISSUE NUMBER: 13 (L39)

STATUS: OPEN

DESCRIPTION:

AM/AP guidelines comparison should appear both in the AM and AP guidelines document.

RESOLUTION:

ISSUE NUMBER: 14 (L40)

STATUS: OPEN

DESCRIPTION:

Should we force concepts not addressed in an existing module to be documented by AP team in an AM rather than directly in the AP?

RESOLUTION:

ISSUE NUMBER: 15 (G21)

STATUS: OPEN

DESCRIPTION:

Using EXPRESS for ARMs has often caused the AP team to model at too low level of detail

RESOLUTION:

ISSUE NUMBER: 16 (G7)

STATUS: OPEN

DESCRIPTION:

Is a big AM = AP? = conformance class?

RESOLUTION:

ISSUE NUMBER: 17 (G6)

STATUS: OPEN

DESCRIPTION:

Industry terms AND industry standards for AM ARM constructs. Both are needed.

RESOLUTION:

ISSUE NUMBER: 18 (G18)

STATUS: OPEN

DESCRIPTION:

When modularizing an application domain does the architecture of the AMs reflect the ARM/requirements view of the domain or the AIM/IR view of the domain? You would get a different set of AMs based on which view was taken.

RESOLUTION:

ISSUE NUMBER: 19 (G11)

STATUS: OPEN

DESCRIPTION:

One distinction between AMs and APs is that an AP must have context. This was the intent of the independent instantiability global rules in an AP. The concept of backbone AMs required in all APs is related and may address this issue. Do we need "context AMs"? Need to discuss and resolve need for complete product contexts.

RESOLUTION:

ISSUE NUMBER: 20 (G17)

STATUS: OPEN

DESCRIPTION:

What does a normative EXPRESS schema as part of the ARM of an AM mean with respect to conformance to the AM versus potential implementations of the ARM schema? ARM status as conformance implementations? Which is more normative - the AIM or the information requirements documented in the EXPRESS ARM?

RESOLUTION:

ISSUE NUMBER: 21 (G13)

STATUS: OPEN

DESCRIPTION:

For AM scope refinement to work, we cannot allow later versions of AMs to change the scope or requirements. No "specialization" of bigger module can occur in smaller modules (e.g., no GLOBAL rules can be added).

RESOLUTION:

ISSUE NUMBER: 22 (G12)

STATUS: OPEN

DESCRIPTION:

Is there a real requirement to base modules on standards other than STEP parts? (our intent was to use IRs, extend IRs, but if requirement is out of scope for IRs, then we use other SC4 standards). What about non-SC4 standards?

RESOLUTION:

ISSUE NUMBER: 23 (G34)

STATUS: OPEN

DESCRIPTION:

For incomplete or not specified ARM EXPRESS data types we should not just specify 'STRING' as then it is indistinguishable from when we really mean characters.

RESOLUTION:

ISSUE NUMBER: 24 (L23)

STATUS: OPEN

DESCRIPTION:

Scope refinement contradicts dated normative reference between modules.

RESOLUTION:

ISSUE NUMBER: 25 (L20)

STATUS: OPEN

DESCRIPTION:

AM ARM should be a valid schema but may not be semantically complete. Put an example in the guidelines. For example, an entity may have no attributes.

RESOLUTION:

ISSUE NUMBER: 26 (G32)

STATUS: OPEN

DESCRIPTION:

Need to remove "NO MAPPING" possibility in ANY mapping table (AM or AP).

RESOLUTION:

ISSUE NUMBER: 27 (L25)

STATUS: OPEN

DESCRIPTION:

Should we use MRM instead of ARM. AM may not need "application" in its name.

RESOLUTION:

ISSUE NUMBER: 28 (G27)

STATUS: OPEN

DESCRIPTION:

Should we force management resource completion in an AM even if it would result in one AM per AP for these. At least that collection would be reusable.

RESOLUTION:

ISSUE NUMBER: 29 (G23)

STATUS: OPEN

DESCRIPTION:

APs must have the product identification module so that all other AM domain can be related to the product.

APs are still about product data (add to the guidelines doc).

RESOLUTION:

ISSUE NUMBER: 30 (L19)

STATUS: OPEN

DESCRIPTION:

When creating EXPRESS ARM from IDEF1X how do we deal with attributes with no type? General guidelines are needed since EXPRESS is more precise.

RESOLUTION:

ISSUE NUMBER: 31 (L36)

STATUS: OPEN

DESCRIPTION:

Need to decide on the scope of a MIM EXPRESS-G diagram that makes sense and is useful given the current approach of no expanded listing in the AM.

RESOLUTION:

ISSUE NUMBER: 32 (L30)

STATUS: OPEN

DESCRIPTION:

Need naming guidelines to avoid conflicts with other AMs, IRs, APs, etc.

RESOLUTION:

ISSUE NUMBER: 33 (G26)

STATUS: OPEN

DESCRIPTION:

If AM has ATS in it (as proposed in London) why not put ATS in AP also. We need to flesh out AM/AP testing and test documentation.

RESOLUTION:

ISSUE NUMBER: 34 (G19)

STATUS: OPEN

DESCRIPTION:

AMs should not have constraints that reflect domain requirements not fundamental to the AM (e.g., limiting uses of something in an AP to ?auto?).

RESOLUTION:

ISSUE NUMBER: 35 (G24)

STATUS: OPEN

DESCRIPTION:

Some concerns about losing AAM in an AP, although AAMs are still a required element of AP NWIs.

RESOLUTION:

ISSUE NUMBER: 36 (G29)

STATUS: OPEN

DESCRIPTION:

AM Annex F is used in AP today to say P21/22. This should not happen in an AM.

RESOLUTION:

ISSUE NUMBER: 37 (G30)

STATUS: OPEN

DESCRIPTION:

It might be useful to allow a different grouping of AOs in UoFs in the AP than what is found in the AM.

Perhaps in AMs too.

RESOLUTION:

ISSUE NUMBER: 38 (G31)

STATUS: OPEN

DESCRIPTION:

May want to change UoFs to new name if UoFs are grouped.

RESOLUTION:

ISSUE NUMBER: 39 (G35)

STATUS: OPEN

DESCRIPTION:

Naming convention for ARM/MIM schemas need to be specified in the guidelines.

RESOLUTION:

ISSUE NUMBER: 40 (G36)

STATUS: OPEN

DESCRIPTION:

Even in the ARM-less approach, traceability of solution back to requirements needs to be kept.

RESOLUTION:

ISSUE NUMBER: 41 (G38)

STATUS: OPEN

DESCRIPTION:

Are AMs going to replace AICs? AMs are meant to be similar in concept to an AIC, just more complete.

RESOLUTION:

ISSUE NUMBER: 81

STATUS: OPEN

DESCRIPTION:

Should the definition of new IR subtypes and/or completely new entities be permitted in MIM?

RESOLUTION:

ISSUE NUMBER: 82

STATUS: OPEN

DESCRIPTION:

Should we permit one document to contain a cluster of related modules? What about one document containing more than one AP?

RESOLUTION:

### ***Framework/Catalogues***

ISSUE NUMBER: 42 (L6)

STATUS: OPEN

DESCRIPTION:

We need a central repository for all application modules.

RESOLUTION:

ISSUE NUMBER: 43 (G5)

STATUS: OPEN

DESCRIPTION:

Document the benefits of AMs (e.g., no std AP)

RESOLUTION:

### ***Technical Development***

ISSUE NUMBER: 44 (L5)

STATUS: OPEN

DESCRIPTION:

Ian Bailey stated a strong requirement for using EXPRESS in the AM ARM to enable EXPRESS-X.

RESOLUTION:

ISSUE NUMBER: 45 (L13)

STATUS: OPEN

DESCRIPTION:

The same IR construct could appear in more than one AM and have different semantics and constraints. When these are used into the AP what problems does this cause? Norman Swindell has an example we will review.

RESOLUTION:

ISSUE NUMBER: 46 (L14)

STATUS: OPEN

DESCRIPTION:

We could have an EXPRESS-2 requirement to pass schema name to global rules based on #L13.

RESOLUTION:

ISSUE NUMBER: 47 (L13)

STATUS: OPEN

DESCRIPTION:

Need global rules to be in the context of the module (or the population based on the module).

RESOLUTION:

ISSUE NUMBER: 48 (L16)

STATUS: OPEN

DESCRIPTION:

Should on AM be able to refine the use of another AM?

- informal propositions seems OK
- global rules seem OK
- we are not sure about subtyping
- text redefinitions?

RESOLUTION:

ISSUE NUMBER: 49 (L26)

STATUS: OPEN

DESCRIPTION:

Reuse of AM definitions not an entire AM. Example is subtypes in module A and B of something in module X and only using supertype entity from X.

RESOLUTION:

ISSUE NUMBER: 50 (L32)

STATUS: OPEN

DESCRIPTION:

There is the expectation that a "backbone" module (or a small set of these) can be developed that will be used by all APs. Is this a reasonable expectation? Are there too many contexts and usages to make this possible? Is this a Part 41 problem?

RESOLUTION:

ISSUE NUMBER: 51 (L37)

STATUS: OPEN

DESCRIPTION:

The proposed approach continues a problem with the existing STEP development in that there are two data models in an AP - an ARM and an AIM. This was not the original intent of the ARM in an AP. In fact the ARM is now normative which increases this problem. Approach should be that AM describes how to use the IRs to meet the requirements.

RESOLUTION:

ISSUE NUMBER: 52 (G25)

STATUS: OPEN

DESCRIPTION:

AP may need to constrain that optional attribute values must have a value. AMs may need to do this also.

RESOLUTION:

ISSUE NUMBER: 53 (G9)

STATUS: OPEN

DESCRIPTION:

AM approach may need EXPRESS-V2 now.

RESOLUTION:

ISSUE NUMBER: 54 (G10)

STATUS: OPEN

DESCRIPTION:

How do we resolve entity A originally defined within an IR in an AP that was used within 2 AMs potentially differently?

RESOLUTION:

ISSUE NUMBER: 55 (L2)

STATUS: OPEN

DESCRIPTION:

Shipbuilding requirement included to point to another APs data in another P21 file. Is this a problem with the proposed approach?

RESOLUTION:

ISSUE NUMBER: 56 (G16)

STATUS: OPEN

DESCRIPTION:

How does the potential need to refine (i.e. subtype) AM constructs in a using AM differ with the current approach? Dave Briggs sees a strong need for subtyping between AMs.

RESOLUTION:

ISSUE NUMBER: 57 (L27)

STATUS: OPEN

DESCRIPTION:

Are AM boundaries driven by the IRs?

RESOLUTION:

ISSUE NUMBER: 58 (L17)

STATUS: OPEN

DESCRIPTION:

Should we allow the use of EXPRESS CONSTANT in AM interpreted model?

RESOLUTION:

ISSUE NUMBER: 59 (L21)

STATUS: OPEN

DESCRIPTION:

If we don't include all INVERSE attributes in AM ARM, we lose some info that was in the application assertions clause.

RESOLUTION:

ISSUE NUMBER: 60 (L22)

STATUS: OPEN

DESCRIPTION:

Are there application objects that should be represented using the EXPRESS SELECT TYPE? Could this cause mapping table problems?

RESOLUTION:

ISSUE NUMBER: 61 (G22)

STATUS: OPEN

DESCRIPTION:

For management resource completion in an AP, do we need application objects and mapping table in the AP?

RESOLUTION:

ISSUE NUMBER: 62 (G8)

STATUS: OPEN

DESCRIPTION:

AM approach may need Part 21 extensions now.

RESOLUTION:

ISSUE NUMBER: 63 (G15)

STATUS: OPEN

DESCRIPTION:

Part 21 changes may be necessary to support AMs - requiring P21 files to fully qualify all entity instances, all within the same data definition section, rather than having multiple data definition sections, each for a separate schema.

RESOLUTION:

ISSUE NUMBER: 64 (G33)

STATUS: OPEN

DESCRIPTION:

INVERSE in AM ARMs cannot reference anything outside the AM. Should not do this unless semantics require it.

RESOLUTION:

ISSUE NUMBER: 65 (G37)

STATUS: OPEN

DESCRIPTION:

Why is colour by itself a module? Why not just use this directly from IR instead of from an AM? Concern is that AMs may be too small. Some seem to add little beyond what is in the IRs. There seems to be some point of diminishing returns from a configuration management and documentation perspective.

RESOLUTION:

ISSUE NUMBER: 66 (G39)

STATUS: OPEN

DESCRIPTION:

Could there be user-defined modules? What about cases where there are references to "externally-defined" concepts outside the AP from within the AP (example in 225).

RESOLUTION:

## ***Process/Organization***

ISSUE NUMBER: 67 (L3)

STATUS: OPEN

DESCRIPTION:

How does modularization and the idea that it seems to imply (or require) a "core model" that is extensible fit together? Where would you get support for creating modules in an area prior to an AP project asking for them?

RESOLUTION:

ISSUE NUMBER: 68 (L8)

STATUS: OPEN

DESCRIPTION:

We need a planning mechanism to identify modules and potential modules which can control the interfaces and integration of modules. This mechanism needs a methodology to follow. Something like the IIM stuff could be the basis for such a methodology.

RESOLUTION:

ISSUE NUMBER: 69 (L9)

STATUS: OPEN

DESCRIPTION:

We need to get a broader review in SC4 of the approach. When is appropriate? How "complete" does the approach need to be prior to doing this?

RESOLUTION:

ISSUE NUMBER: 70 (L10)

STATUS: OPEN

DESCRIPTION:

Where do AMs and related documents fit into SC4?

RESOLUTION:

ISSUE NUMBER: 71 (L11)

STATUS: OPEN

DESCRIPTION:

Where do AMs fit in the part structure?

RESOLUTION:

ISSUE NUMBER: 72 (L33)

STATUS: OPEN

DESCRIPTION:

How does modularization relate to the "point release" vs. "major release" of STEP and other SC4 standards? Can we really modularize well in a point release?

RESOLUTION:

ISSUE NUMBER: 73 (G2)

STATUS: OPEN

DESCRIPTION:

Granularity guidance (for configuration management)

RESOLUTION:

ISSUE NUMBER: 74 (G1)

STATUS: OPEN

DESCRIPTION:

The process and logistics for developing, managing and maintaining application modules needs to be documented.

RESOLUTION:

ISSUE NUMBER: 75 (G4)

STATUS: OPEN

DESCRIPTION:

We need a timeline for transformation to AM-based APs from the current structure.

RESOLUTION:

ISSUE NUMBER: 76 (G3)

STATUS: OPEN

DESCRIPTION:

We will need a process for identification and consolidating application modules.

RESOLUTION:

ISSUE NUMBER: 77 (L4)

STATUS: OPEN

DESCRIPTION:

If AMs go through the same ballot/development process as an AP they will cost too much.

RESOLUTION:

ISSUE NUMBER: 78 (G14)

STATUS: OPEN

DESCRIPTION:

We need configuration control policies for AM & AP to address scope refinement (form, fit, function) change and versions of modules that fix errors and thus should produce a different schema in the using AP or AM (like configuration management of assembly products, where policy is FF&F).

RESOLUTION:

ISSUE NUMBER: 79 (G28)

STATUS: OPEN

DESCRIPTION:

With the concept of "advanced industry standards", there are much more useful publication media and formats.

RESOLUTION:

ISSUE NUMBER: 80 (G20)

STATUS: OPEN

DESCRIPTION:

Cost of translator should be a driver especially for Small and Medium sized Enterprises (SME).  
**RESOLUTION:**